

WHAT IS CLAIMED IS:

1. A maximum power follow-up control apparatus for setting an operating voltage of a power converter that converts an output voltage of a power generator into AC power so as to make a power point of an output power of the power generator, which corresponds to an output level of the power generator, follow up with a maximum power point, the maximum power follow-up control apparatus comprising:

an approximate function storing part that stores an approximate function related to a maximum power point corresponding to the output level of the power generator of characteristics of the output power and the operating voltage, and

a control part that calculates an operating voltage value corresponding to the present output power on the basis of the approximate function as stored in the approximate function storing part and that sets this operating voltage value as an operating voltage value of the power converter in order to make the power point related to the output power in correspondence with the output level of the power generator follow up with the maximum power point.

2. The maximum power follow-up control apparatus according to Claim 1, wherein the control part includes

a voltage value calculating part that calculates an operating voltage value corresponding to the present output power of the power generator on the basis of the approximate

function,

a voltage value setting part that sets the operating voltage value as calculated by the voltage value calculating part as an operating voltage value of the power converter, and

a judging part that calculates an operating voltage value corresponding to the present output power in the voltage value calculating part upon setting the operating voltage value in the voltage value setting part and that judges whether an absolute value of a difference between the calculated operating voltage value and the present operating voltage value is within a specified threshold or not,

wherein when it is judged by the judging part that the absolute value of the difference between the operating voltage values is within the specified threshold, it is recognized that the power point related to the output power that corresponds to the output level of the power generator has reached proximate of the maximum power point.

3. The maximum power follow-up control apparatus according to Claim 2, wherein the control part is arranged in that the operating voltage value of the power converter is set to make the power point related to the output power of the power generator reach the maximum power point by utilizing a hill-climbing method for maximum power follow-up control when it has been recognized that the power point related to the output power that corresponds to the output level of

the power generator has reached proximate of the maximum power point.

4. The maximum power follow-up control apparatus according to Claim 2, wherein the control part is arranged in that, when it is judged by the judging part that the absolute value of the difference between the operating voltage values is not within the specified threshold, the operating voltage value is calculated in the voltage value calculating part, the calculated operating voltage value is set in the voltage value setting part, and operations of the voltage value calculating part, the voltage value setting part and the judging part are continued until the absolute value of the difference between the operating voltage values falls within the specified threshold in the judging part.

5. The maximum power follow-up control apparatus according to Claim 1, further comprising a first approximate function creating part that detects a maximum power point for each output level of the power generator and that creates the approximate function on the basis of at least two maximum power points.

6. The maximum power follow-up control apparatus according to Claim 5, wherein the first approximate function creating part detects the maximum power point of each output level of the power generator by utilizing a hill-climbing method for maximum power follow-up control.

7. The maximum power follow-up control apparatus

according to Claim 6, further comprising an abnormality noticing part that notices an abnormality of the power generator when it is judged that the approximate function created in the first approximate function creating part is abnormal.

8. The maximum power follow-up control apparatus according to Claim 1, further comprising a second approximate function creating part that separates, by dividing the output power into a plurality of level regions and by sequentially detecting power points, the detected plurality of power points into respective level regions, that calculates average values of the plurality of power points separated into respective level regions for setting the average values of each of the level regions as maximum power points, and that creates the approximate function on the basis of the maximum power points for each of the level regions.

9. The maximum power follow-up control apparatus according to Claim 8, wherein the second approximate function creating part detects the power points by utilizing a hill-climbing method for maximum power follow-up control.

10. The maximum power follow-up control apparatus according to Claim 9, further comprising an abnormality noticing part that notices an abnormality of the power generator when it is judged that the approximate function created in the second approximate function creating part is abnormal.

11. The maximum power follow-up control apparatus according to Claim 1, wherein the approximate function storing part is arranged to preliminarily store approximate functions corresponding to types of the power generator.

12. The maximum power follow-up control apparatus according to Claim 11, further comprising a first approximate function correcting part that detects a maximum power point for each output level of the power generator by using a hill-climbing method for maximum power follow-up control and that corrects the approximate functions as stored to correspond to each type of the power generator on the basis of the detected maximum power point.

13. The maximum power follow-up control apparatus according to Claim 2, further comprising a second approximate function correcting part that detects a maximum power point for each output level of the power generator by using a hill-climbing method for maximum power follow-up control when it has been recognized that the power point related to the output power that corresponds to the output level of the power generator has reached proximate of the maximum power point, and that corrects the approximate functions as being stored in the approximate function storing part on the basis of the detected maximum power points.

14. The maximum power follow-up control apparatus according to Claim 2, further comprising a third approximate function correcting part that executes follow-up operations

to the maximum power point by using a hill-climbing method for maximum power follow-up control when it has been recognized that the power point related to the output power that corresponds to the output level of the power generator has reached proximate of the maximum power point, and that corrects only an intercept of the approximate function without changing its slope on the basis of the power point as detected by the follow-up operation.